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## From speed to volume: reframing clothing production and consumption for an environmentally sound apparel sector

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**Keywords:** Speed, volumes, clothing consumption, wardrobe studies.

**Abstract:** The article highlights the limitations of speed as a framework for discussing and tackling the environmental challenges of growing clothing volumes or quantities. This argument builds on a series of wardrobe studies mapping the number of clothing items owned, purchased, and disposed of by 25 people during six months, and the reasons behind purchase and disposal. The results indicate that clothing consumption is rarely driven by replacement and that opportunity plays a main role. These characteristics of clothing consumption explain why it takes more than producing long-lasting garments to reduce clothing demand. Rather than delaying the disposal of garments, a more straight-forward focus on reducing production is needed, that is the contribution of a volume-centric approach.

### Introduction: a growing clothing mountain

Accounts of the environmental burden of the apparel sector have surpassed technical and scholarly literature and trickled into popular media. Public attention to this issue may be explained by the fact that (this being the “second most polluting industry” or not) the rapid changes in the sector since the 1980s are visible to all. The production of garments is now based on countries with low wages and shipped all over the world (Schor, 2005), prices have fallen relative to other consumer goods (EEA, 2014) and the launching of new collections has speeded up (Tokatli, 2008). As a consequence, demand has grown (EEA, 2014), as have the volumes of textiles disposed of. The international second-hand trade is overflooded and used textiles are struggling to find an environmentally-sound destination (Ljungkvist, Watson, & Elander, 2018). Rising volumes of virgin materials are needed to fuel this industry (FAO/ICAC, 2013), as are the resources necessary for the production and finishing of products, distribution and retail, and post-consumer textiles processing (e.g. Roos, Sandin, Zamani, & Peters, 2015). In short, the sector has a problem of volumes, with some estimations reporting growth in the worldwide volume sold between 2000 and 2015 by 100% (Euromonitor in Ellen McArthur Foundation, 2017), while global population grew by around 20%.

Nevertheless, most actions taken by industry and governments for reducing the environmental impact of the sector are still focused on impact per product and disregard the issue of clothing quantity. In the United Kingdom, for instance, the Waste and Resources Action Programme (WRAP) convened an industry-wide commitment supported by governments to reduce the environmental burden of the whole clothing supply chain. An intermediate balance of the commitment’s results published in 2017 highlights savings in carbon emissions (10.6%), use of water (13.5%), and waste (0.8%) per ton of clothing sold since 2012. But given growth in the total tonnage sold in the same period by 19%, the absolute impact of the sector increased (WRAP, 2017). These results illustrate the urgency of developing actions for reducing clothing production volume, alongside others focused on impact per product or ton.

### Slowing down

One exception to the lack of attention on clothing volume in the field has been the work of sustainable fashion academics and practitioners on speed (e.g. Aakko, 2013; Clark, 2008; Cooper et al., 2013; Fletcher, 2012; Laitala and Klepp, 2015; Langley et al., 2013; McLaren et al., 2015). By addressing clothing longevity and durability, and the value of slow fashion as opposed to fast fashion products,

such scholarship implicitly engages with volume. It considers growing quantities in the context of production and consumption acceleration. However, this article highlights the limitations of speed as a framework for discussing clothing volume. While acknowledging the value of speed related approaches, the study calls for a straightforward focus on quantities to advance effective actions.

In the literature, “fast” is often used to imply “more”, and “slow” or “durable” to refer to “less” (e.g. Cooper et al., 2013; Greenpeace, 2017; WRAP, 2012). However, rather than being synonyms, these notions describe different qualities of production and consumption. The conceptual overlap of volume and speed leads to regarding product lifetimes as if they had environmental impact, when it is clothing production that poses environmental challenges (see e.g. Roos et al., 2015). For example, the influential 2012 WRAP report states that “extending the average life of clothes by just three months of active use per item would lead to a 5-10% reduction in each of the carbon, water and waste footprints”; but delaying disposal per-se does not result in environmental gains. This percentage is calculated by assuming delay in the production of new clothes, as if new garments were produced in order to replace disposed ones. However, this study claims that clothing purchases are rarely based on replacement; therefore, speed and volumes are not interchangeable.

Previous research on consumer influence on product life spans has already pointed out that purchases are made “without reference to any evaluation of existing possessions. Consequently, even when it might appear that product life spans are being optimized, environmental impacts may be increasing” (Evans & Cooper, 2010, p. 344). This study argues that this is often the case in clothing. Building on a series of wardrobe studies, the article highlights the value of a volume-centric approach for discussing and tackling the environmental impact of the sector.

## **Wardrobe studies**

In 2017, we carried out 40 wardrobe audits in the Netherlands in order to answer other related research questions (Maldini, Stappers, Gimeno-Martinez, & Daanen, 2019). A secondary finding of that study was that clothing consumption is rarely based on replacement and wardrobes can grow and decrease over time. Therefore, the environmental advantages of delaying disposals are questionable. This article revisits those wardrobe audits with a focus on 25 respondents that traced the items coming in and out of their wardrobe during the six months following our visit. The analysis is based on quantitative and qualitative data that has not been previously published.

### *Respondents*

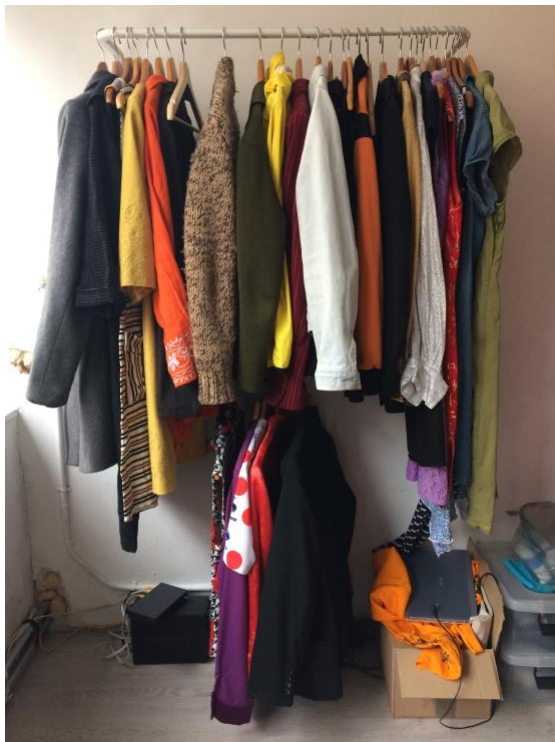
The wardrobes considered in this study belong to 25 subjects living in different provinces of the Netherlands. The group is varied in terms of age (22 to 71 years old), household composition (living alone, in couples, with children, or in shared households), house size (38 to 400 m<sup>2</sup>), and income (from <€20,000 to >€80,000 annual gross income per household). Most of respondents live in cities, but some live in villages and towns. Lastly, the group includes 20 females and five males. This over-representation of women is a result of the profile of respondents sending back the completed forms after the study.

### *Method*

During the wardrobe audits, respondents counted the number of garments owned in the presence of the researcher and according to previously defined garment types. The concept of “wardrobe” was considered broadly, including all garments owned by respondents regardless of the place where they were stored. Socks and underwear were excluded for privacy and practical reasons, but accessories such as shoes, hats, scarves and gloves were included. The counting process started at the hall of the home, continuing at the closet, the laundry area, and extra storage spaces such as the attic or spaces underneath the bed (see Fig. 1).

Starting at the date of the visit, respondents kept track of their wardrobe inflow and outflow during six months, handing the information to the researcher after completion (see Table 1). All relevant items (so no socks or underwear) coming in and out of the wardrobe were documented in a provided form, including items made, bought, received as presents, given away, thrown away, etc. The form included details such as date, garment type, and reasons for acquisition or disposal. Responses were processed anonymously with no compensation offered to the subjects.

Next, the reasons for acquisition and disposal stated by respondents were classified in categories to enable further analysis (see Table 2). The categories were defined by grouping similar answers, although some responses were unclear, unstated or too general/particular to enable classification. In any case, this categorization should not be considered as a comprehensive taxonomy of the reasons driving wardrobe flow, but simply as a means to discuss the points introduced above.



**Figure 1.** Some of the items in the wardrobe of respondent 19.

## Results

Table 1 gives an overview of the number of items owned by respondents during the audits, and their wardrobe inflow and outflow during six months. Only one of the 25 wardrobes (respondent 16) had equal number of items coming in and out. All other wardrobes grew or decreased during that period.

Respondent number	Initial wardrobe volume (items)	Wardrobe inflow (items)	Wardrobe outflow (items)	Difference (items)
1	268	21	32	-11
2	453	12	6	6
3	208	13	29	-16
4	200	6	0	6
5	429	21	48	-27
6	228	11	2	9
7	346	16	3	13
8	70	11	14	-3
9	164	28	32	-4
10	343	11	23	-12
11	353	7	10	-3
12	324	2	36	-34
13	124	12	5	7
14	100	15	14	1
15	259	14	5	9
16	126	23	23	0
17	235	16	11	5
18	167	9	0	9
19	272	11	15	-4
20	132	8	1	7
21	257	11	9	2
22	254	7	13	-6
23	87	7	2	5
24	263	13	3	10
25	390	7	46	-39

**Table 1.** Respondents' initial wardrobe volume and inflow/ outflow during a 6-month period (in number of items).

Replacement was not a significant driver for inflow (see Table 2). Only 12 of the 312 clothing items coming in the wardrobes was purchased or made with the purpose of replacing a disposed item. This was the case for respondents whose “old sneakers had holes”, “old sweater needed replacement” or “favorite Levi shirt is too small now”.

Participants bought, received, and made clothing for other reasons. Opportunity was the main driver for wardrobe inflow. In 89 of the 312 items, decisions to acquire a new item were based on reasons such as “sale more than 50%!!”, “I found it while I bought the skirt”, or “free”. Sixty items were purchased on the basis of previously considered needs and wants. For example, items “needed for summer”, “wanted to wear over tank tops, or “needed for walking the dog”.

Other items got in respondents’ wardrobes because of their aesthetic (“It is yellow!”, “I loved it and it went really well with my new coat”, “I like the clean lines and the way it compliments my shot hair”) or functional qualities (“warm”) or were intended for special occasions (“event coming up, wanted to look impressive and new”).

INFLOW	
Reasons	Items
Opportunity	89
Need/Want	60
Aesthetic	50
Special occasion	24
Functional	12
Replacement	12
Unclassified	89
Total	312
OUTFLOW	
Reasons	Items
Worn out/broken/old	91
Style change	66
Body change	61
Initially unsuitable	39
Have better alternatives	12
Unclassified	113
Total	382

**Table 2. Total wardrobe inflow and outflow classified by the reasons stated by respondents.**

Reasons for given away, donated, and thrown away items included garments broken or worn-out (“too old to wear”) or initially unsuitable (“didn’t like it in the first place, “too big, it was a gift”). In other cases, outflow decisions were based on style (“old fashioned, I am not going to use it anymore”, “not fun anymore”) or body changes (“didn’t fit anymore”). Lastly, some items were discarded based on the presence of better alternatives (“have better ones”, “have so many”).

In sum, the results of the study point out to a variety of drivers for wardrobe inflow (clothes received, made, and purchased) and outflow (clothes disposed of). Some of these reasons are connected to other items in the wardrobe (classified as replacement, need/want, have better alternatives). The majority of the inflow decisions, however, are unrelated to the items already owned (opportunity, aesthetic, functional, special occasion). They respond to other motivations such as pleasure in the act of purchasing or anticipated use.

These results underline the limited connection between wardrobe inflow and outflow and - more importantly - between speed and volume. If wardrobe inflow was exclusively driven by outflow, extending the lifetime of garments could have straightforward effects on clothing demand, but the data discussed above shows that this is not the case.

### *Discussion*

As we have argued in an earlier study (Maldini & Stappers, 2019), strategies aiming at reducing clothing production volumes on the basis of garments’ emotional and material durability tend to see the wardrobe as a collection with permanent volume, driven by need. As a need-driven collection, the wardrobe would be subject to “pull” forces solely, and new garments would be purchased to replace unsatisfactory pieces.

However, the data points out that clothing consumption follows other logics. Respondents incorporated and disposed of garments for a variety of reasons; new items were bought without consideration of those already owned,

and owned items left the wardrobe because more attractive ones were coming in. The 12 garments disposed of because participants “had better alternatives” show that “push” forces drive clothing consumption as much as “pull” forces.

Moreover, the incorporation of new garments for opportunity-related reasons confirms that inflow and outflow are not always associated. The power of an owned (materially or emotionally durable) item in preventing a new purchase driven by “sale more than 50%!!” or “it is yellow!” is evidently limited. Lastly, the strong effect of “opportunity” and impulsive purchasing on overall wardrobe inflow may explain why 39 of the 382 items disposed of were considered “initially unsuitable” after purchase.

These characteristics of clothing consumption clarify why it takes more than producing long-lasting garments to reduce clothing demand. Rather than delaying the disposal of garments, a more straight-forward focus on reducing production is needed, that is the contribution of a volume-centric approach.

### **Conclusion: from speed to volume**

This study has argued that placing production volumes at the core of the sustainable fashion agenda would help tackling the exponential growth of the sector’s impact. Acknowledging the conceptual difference between volume and speed is important because they call for different actions to address them. Actions aimed at prolonging product lifetimes may justify the production of new (materially and emotionally durable) products. From a volumes perspective, however, the aim is to diminish the quantity of new products altogether, leading to reductions in the absolute environmental impact of the sector.

Aiming at a reduction in production volumes has important political and economic implications that have not been discussed here, fundamental changes in this respect are surely needed to overcome the ecological crisis. A volume-centred framework can be linked to a variety of perspectives critical to mainstream politics and economics, while at the same time ensuring positive and concrete environmental change.

Lastly, while tackling production volumes is particularly imperative in the apparel sector, the discussion above applies also to other product categories. In building on product volumes or quantities, the field of fashion can bring relevant and novel perspectives to the bigger table of sustainable production and consumption. Sustainable fashion has borrowed much from scholarship focused on other products such as household appliances. The work on emotionally durable design and attachment in clothing is an example of that. But such scholarship does not usually acknowledge practices such as collecting, accumulating or impulsive purchasing. In building a volume-centric framework, sustainable fashion research can help to expand perspectives in thinking about products and the environment within the broader field. This study is a contribution to that end.

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